Special Publication SP-43

WOOD MARKET TRENDS IN JAPAN

CHRIS GASTON
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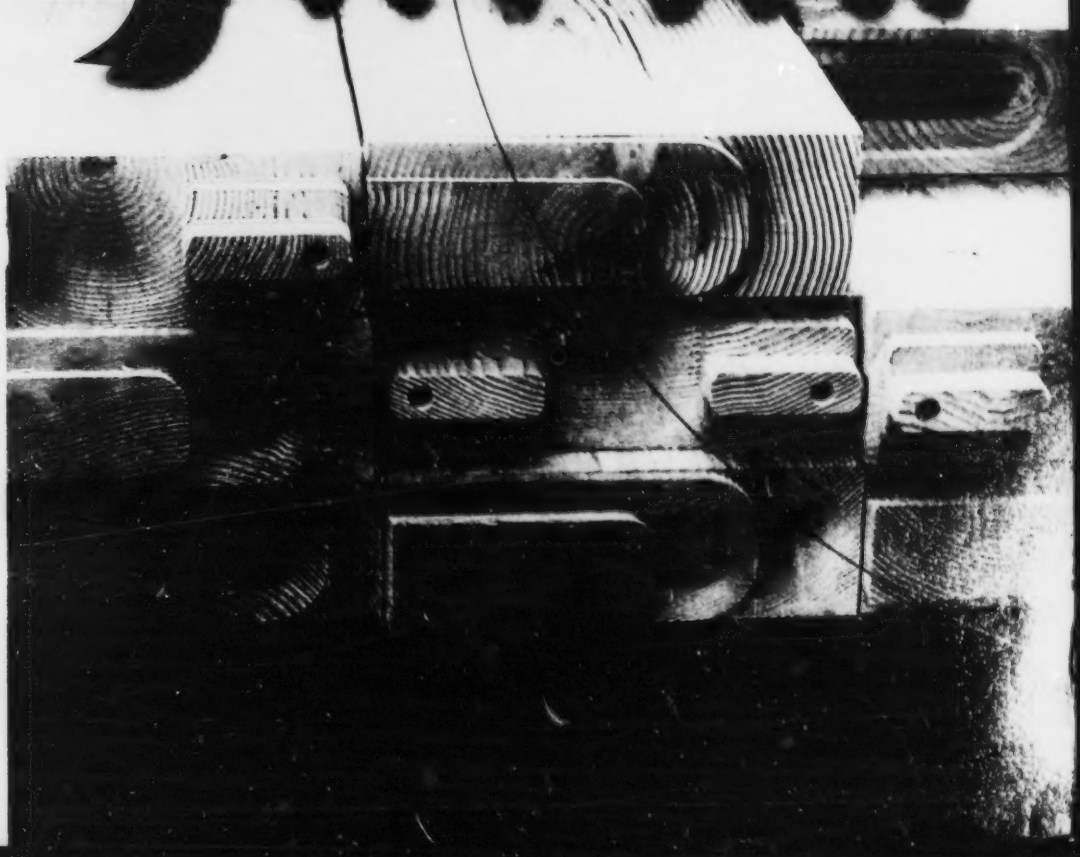

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Introduction

"There are... a number of very powerful trends..., all of which challenge the competitive advantage that Canada has enjoyed in Japan."

Canada's softwood products industry has always been a very important part of its economy, with 1997 exports totaling CDN $ 17.5 billion for solid wood products. Softwood lumber is the largest contributor to export revenues (76%), followed by wood-based panels, and other further processed items. Log exports accounted for less than 2% of export revenues.

Together with pulp and paper, forest products exports contribute more to Canada's balance of trade than all other sectors combined ($34.1 billion).

While the U.S. is clearly the primary export destination, trade to Japan has become an increasingly important component of Canada's export mix. Softwood lumber exports, for example, have grown from less than 500,000 cubic metres in 1965 to nearly 7,000,000 cubic metres in the peak of 1996 (Figure 1).

This trade to Japan has not only been an important market for diversification (particularly in light of reduced trade to Western Europe), but it has been an important outlet for higher grade lumber products. This is illustrated in Figure 2, which shows the consistently large price premium of lumber sold to Japan over that of the U.S. Even comparisons of spruce-pine-fir dimension lumber alone show such a premium, due to Japan's historical willingness to pay more for the appearance of construction lumber.

In the future, Japan will undoubtedly remain an important market for Canadian softwood. While there is a growing awareness and interest in "value-added" products such as softwood furniture, flooring, doors and windows, the reality is that these end-uses only consume a very small fraction of the softwood that goes into house construction. With wooden housing starts of 500,000 to 700,000 units per year over the past decade, Japan is by far the most important market for construction lumber and panels after

Figure 1
Canada exports of softwood lumber, by volume
Statistics Canada

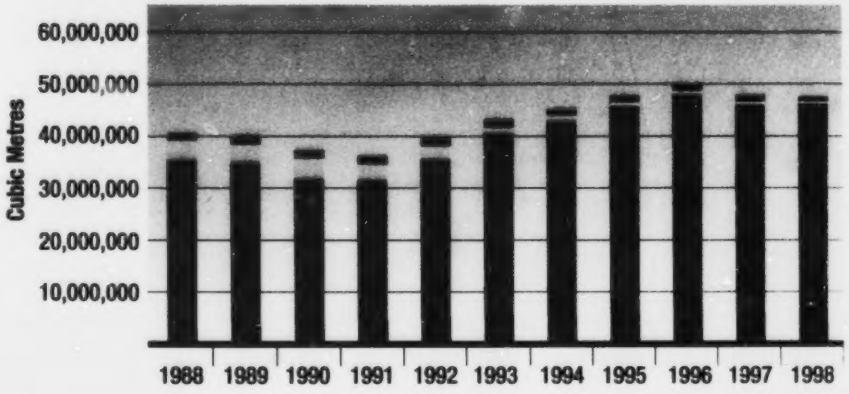
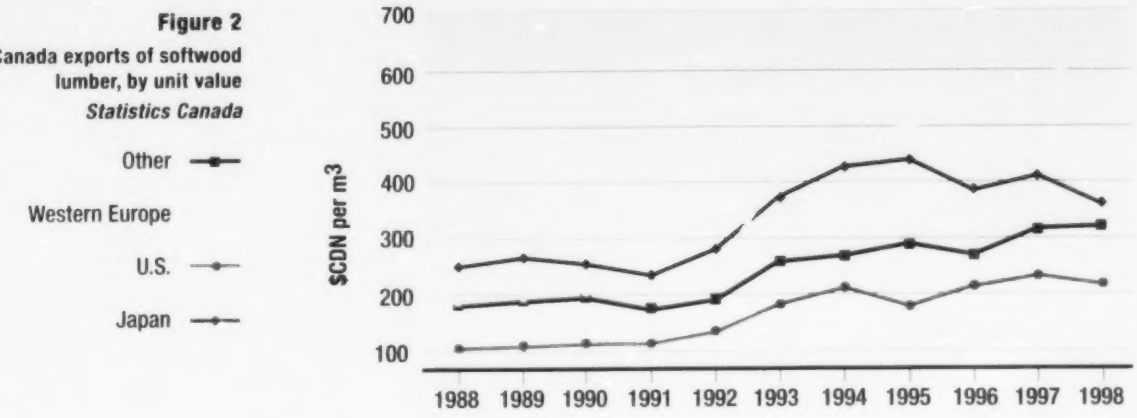


Figure 2

Canada exports of softwood lumber, by unit value

Statistics Canada



the U.S. Further, given that the Japanese tend to use higher grades of lumber, Canadian sales to this end-use is adding value, at least incrementally.

There are, however, a number of very powerful trends that are challenging the competitive advantage that Canada has enjoyed in Japan. Some of these are well established trends over many years, and others are rather dramatic recent changes in either the supply or demand of wood products in Japan.

The identified trends in the use of wood products in Japan are:

DEMAND	**Trend 1**	The purchase power of the Japanese yen is increasing
	Trend 2	Kobe earthquake drives interest in home performance
	Trend 3	Japan's aging population stimulates "healthy house"
	Trend 4	Japan embraces N.A. platform-frame home construction
	Trend 5	Japan post & beam construction moves to "pre-cut"
	Trend 6	Japan post & beam construction moves to engineered wood products
	Trend 7	Japan experiments with a "hybrid" construction style
	Trend 8	Number of multi-family wood homes poised to increase
	Trend 9	Government of Japan's desire to reduce home costs
	Trend 10	Revisions to the Building Standards Law drives performance
	Trend 11	Secondary wood product demand changes: a) Trend to lighter colors b) Trend to "western" look c) Trend to outdoor living d) Trend to more wood flooring (healthy house)
SUPPLY	**Trend 12**	Japan's post-war plantations come on stream
	Trend 13	Wood product trade becomes more global

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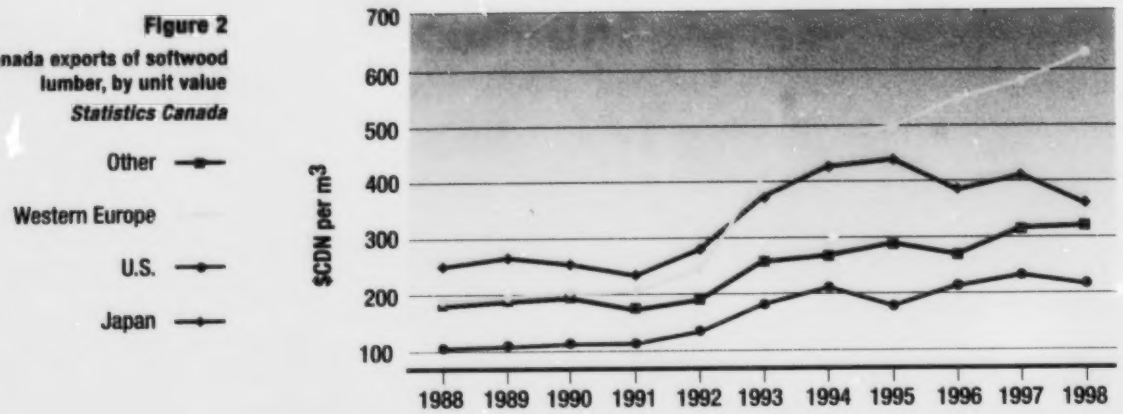

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Japanese supply becomes global; shipments sitting at Tokyo Lumber Terminal from Sweden, Austria and the U.S.

These trends were identified from a recently completed study, *Japan's Value-Added Market: Wood Products' Attributes and Competition*. The overall intent of this study was to identify attributes demanded in the Japan market for a number of wood end-use categories, look for fits with the BC/Canadian wood resource and technologies, and to identify competitive positioning (Figure 3). The study resulted in the publication of 11 individual reports, this being in essence the executive summary of the key results (see page 32 for a listing of the reports and ordering information).

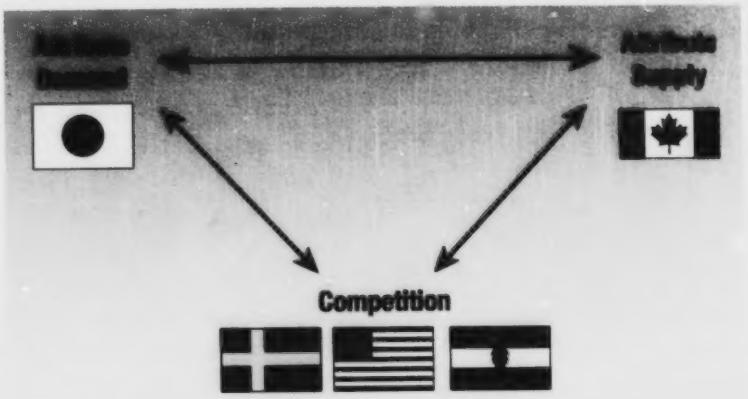


Figure 3
Competitive linking of wood product supply and demand

Edge-glued panels for countertops

TREND

1

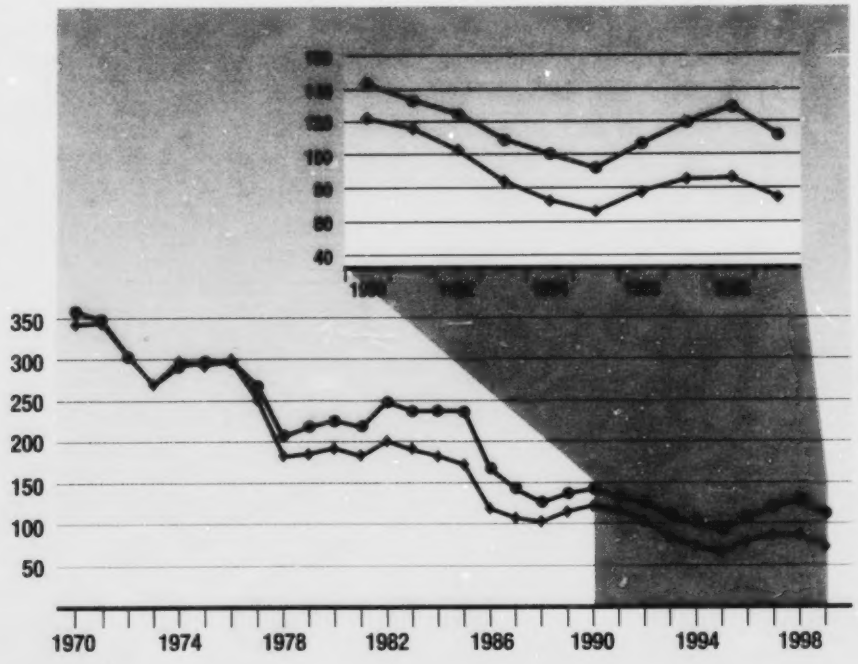
The purchase power of the Japanese yen is increasing

"Japanese importers are paying less in real yen for virtually any wood product today than they were three decades ago!"

Perhaps one of the most striking trends over time has been the ever-increasing value of the Japanese yen against all western world currencies, shown for the U.S. and Canada in Figure 4. From 1970 to present day, the yen has appreciated so much that in actual fact, Japanese importers are paying less in real (inflation adjusted) yen for virtually any wood product today than they were three decades ago! This is illustrated in Figure 5, showing the value of the Japanese imports of Canadian softwood lumber in aggregate from 1966 to 1999, in thousands of yen per cubic metre. This is a fact that is often overlooked because of the strong gains in the yen relative to the dollar. From the Canadian exporters' point of view, prices stayed stable over time, or even increased for selected items.

Since 1995, being the beginning of the so-called "Asian Flu", there has been much press and speculation about the drop in the purchase power of the yen, and growing worries about the ability of Canadian wood products to compete in this market place. While Figure 4 illustrates that the recent drop in the yen relative to the U.S. and Canadian dollars seems rather inconsequential to the longer term trend established since

Figure 4
The Japanese yen against Canadian and U.S. dollars
Statistics Canada



1970, the drops in overall wood product imports in 1998 punctuate the concern. What would happen if the Japanese yen did drop to the late 1970s level of roughly 200 yen per Canadian dollar? This is a question to be addressed again in this report, and the outcome is not favorable to either the imports of Canadian or any other country's wood products.

When thinking about exchange rate trends and the vulnerability of the Canadian supplier in world wood markets, it is also interesting to look at real (inflation adjusted) prices of sales to the U.S. as well as to Japan (Figure 6). Note that while the real prices in Canadian dollars of exports to Japan have declined over time, the real prices of exports to the U.S. have remained constant.

Figure 5
Inflation adjusted landed price of Canadian softwood lumber in Japan, in yen
Japan Tariff Association

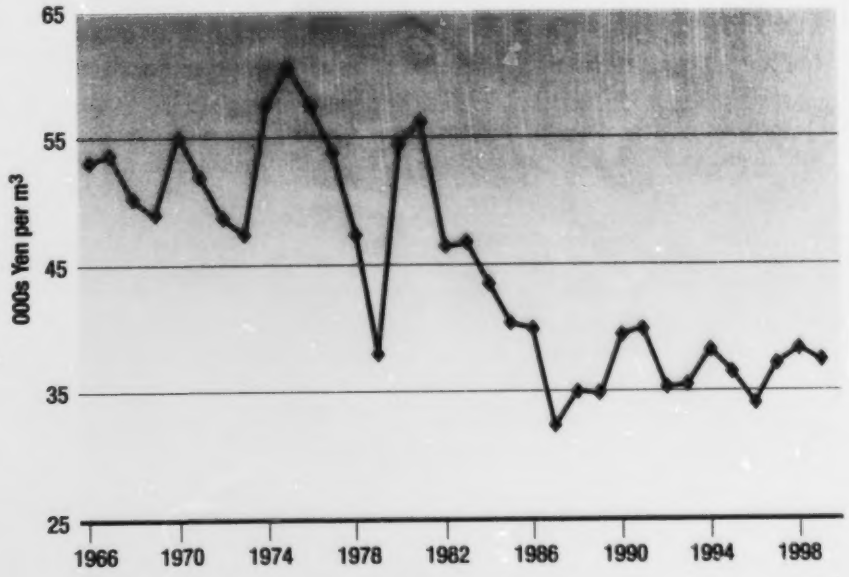
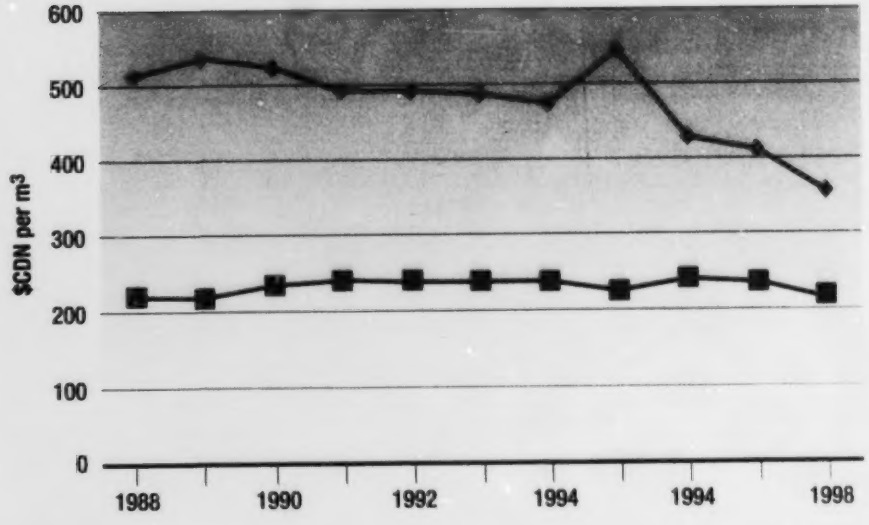


Figure 6
Inflation adjusted prices of Canadian exports to the U.S. and Japan
Statistics Canada



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TREND

2

Kobe earthquake drives interest in home performance

Perhaps the largest *structural* change in the Japanese demand for wood products in construction can be related to recent earthquakes in Japan. One of the main reasons for the historical price premiums of softwood construction lumber in Japan have been related to aesthetic qualities, such as clear wood, tight growth rings, and consistent color. The "performance" of the house structure was almost secondary. In fact, over recent history, the average life expectancy of the Japanese single family home has been only 26 years!

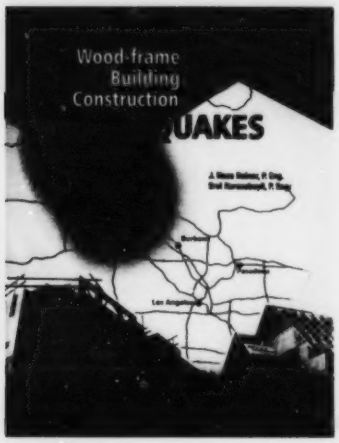
Whether it was the shock of the Kobe earthquake alone, or a combination of this disaster with other factors such as the disquieting effect of the "Asian flu" on consumer confidence, the demand has moved toward increased performance attributes of building systems, wood structural members, and engineered wood products (primarily glulam). Figure 7 illustrates a small sample of the market research carried out during the study reported here.

Note than in all three product categories, the attributes that are ranked highest are those related to performance, while those that ranked lowest included the source of the wood product or the country of manufacture.

The trend toward housing performance has directly or indirectly affected almost every other trend to be discussed in the balance of this report, including the shift in the Building Standards Law from prescriptive to performance based (Trend 10).

Figure 7
Attributes demanded for wood building products by consumers

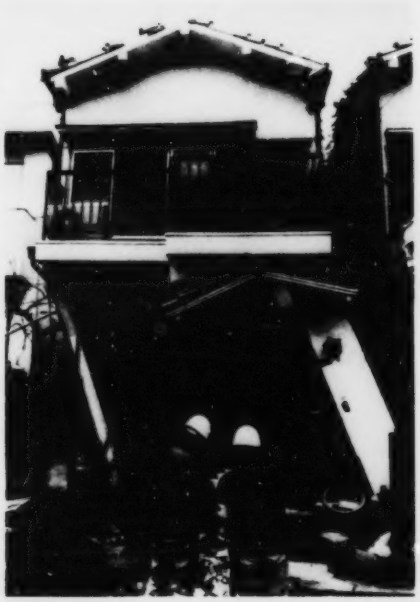
Building Systems		Wood Structural Members		Engineered Structural Members	
	score		score		score
Durability	268	Strength	316	Strength	304
Strength	265	Price	247	Durability	261
Construction method	177	Utility (falldown)	224	Price stability	228
Design	162	Species	135	Connections	139
Structural material	122	Colour	119	Security of supply	108
Green vs. dry	103	Treatability	110	Species	88
Detached	81	Finish	38	Supply reliability	71
Size of house	37	Durability	17	Treatability	45
Size of structural members	26	Weight	17	Source of material	9
Country of origin	10	Sizes	16	Country of manufacture	7
		Security of supply	15		
		Source of supply	12		



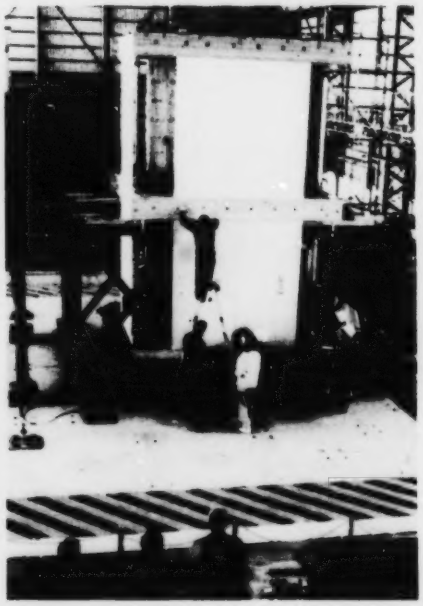
Forintek's Special Publication SP-40 indicates that of the seven major global earthquakes over the past 40 years, there have been less than 35 fatalities in platform-frame wooden homes!

PRODUCT OPPORTUNITY

- Performance labeling
- Promotional efforts to equate Canadian wood, and the platform-frame/hybrid systems using Canadian products, to performance
- Promoting the strength properties of Canadian dimension lumber and panels in post & beam hybrid homes, taking advantage of our knowledge base on performance characteristics and in-grade testing
- Promoting the performance properties of engineered wood products



Post & beam earthquake damage in Kobe



Shake table test of a two-story shear wall specimen at the National Research Institute for Earth Science and Disaster Prevention (NIED), Science and Technology Agency of Japan.

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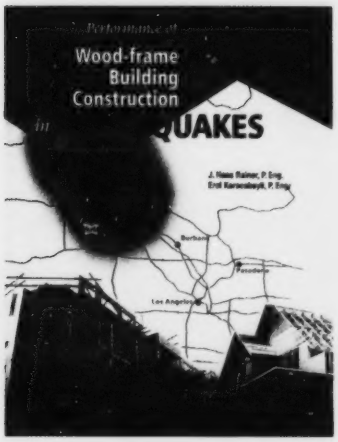

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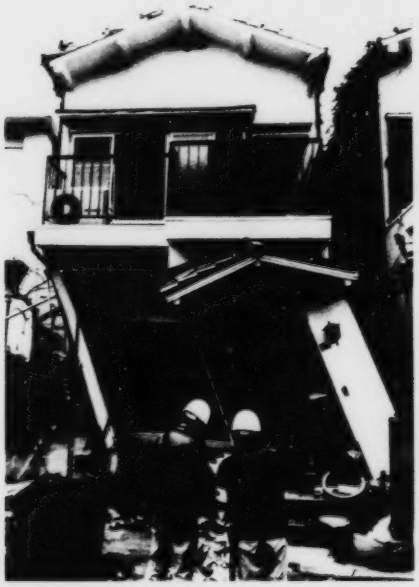

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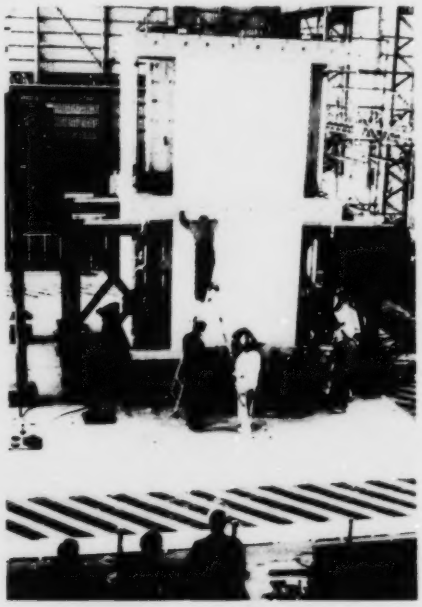

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Japan's aging population stimulates "healthy house"

There are a number of significant changes in Japan's population that have affected, and will continue to affect, housing demand.

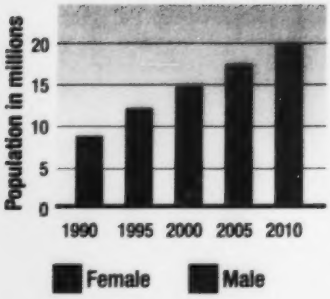

Figure 8
Japanese population that are 70+ years of age

Rapidly aging population

- greater than 15% of total population by 2010 will be 70+ years of age (less than 10% in 1996) (Figure 8)
- women outnumber men 2:1
- will strain government social programs (health, housing and pension)
- the 70+ years of age segment tend to be landowners
- continued increase in multi-generation housing

Population trends

- population stagnation due to low immigration, low birth rates, fewer and later marriages
- declining housing starts (less than 1 million/year by 2008)
- end of population shift from rural to urban centres will lead to a decreasing proportion of concrete high-rise apartment starts; this will include increasing single-family detached homes and low-rise (three- to four-story) units
- a substantial minority of Japanese families will shift from nuclear family to expanded (*not* extended) family which will have three or more generations under one roof living semi-independently. This will lead to larger houses with double kitchens, bathrooms, etc.
- owners continue to replace homes after 20-30 years due to style changes, decay, inadequate size and the fact that renovation is too costly

PRODUCT OPPORTUNITY

- **Need for seniors' housing facilities, both single and multi-unit; barrier free and low rise stairs or elevators**
- **Likely increase in single family detached homes against declines in apartment complexes; more square footage, more wood used per unit**
- **Need for second smaller kitchen and bathroom, wood stair parts, and support rails in seniors' portion of the multi-generation house**

Healthy house trends

"Healthy house" is a concept frequently referred to in Japan these days. However, healthy house is a concept with a wide range of interpretation. Related to healthy housing in the minds of Japanese administrators, builders, and consumers are:

- indoor air quality (specifically formaldehyde emissions from wood panels)
- increased use of natural materials and decreased use of synthetics
- barrier-free to increase accessibility for an aging population
- increases to living space of residences
- energy efficiency

Initiatives have been introduced by various government agencies to move forward with each one of these points.

PRODUCT OPPORTUNITY

- **Low formaldehyde panels and engineered wood products**
- **Solid and composite wood flooring (needs to be ready to assemble)**
- **Accessibility-related building products**
- **Imported houses incorporating one or all of the above**

Photo credit: Kenneth Hamm, PHOTO JAPAN, Washington, U.S.A.

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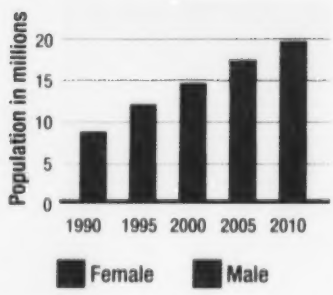

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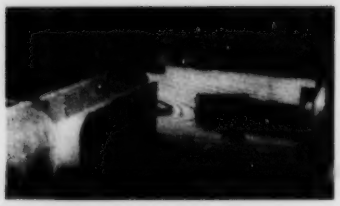
4

Japan embraces N.A. platform-frame home construction

One of the main reasons that global suppliers of softwood products look to Japan as a portion of their exports mix is that it is the only country in the world outside of North America that builds a significant number of wood single family detached homes. This construction is dominated by post & beam architecture, historically featuring exposed wooden structural members for aesthetics, as well as an extensive use of joinery as opposed to nails and metal connectors. The post & beam home utilizes larger dimension lumber than that typical of North American platform-frame construction, with posts ranging around 120 millimetres square and beams 120 by 240 millimetres. The lumber has typically been green, and the joinery hand chiseled on-site by master carpenters. In terms of Canadian supply, this housing style has led to an important market for BC Coast green Douglas-fir, hem-fir, yellow cedar, sitka spruce, and other coastal species.



Examples of joinery connectors in Japan

Two trends have been occurring over the past two decades with regard to the use of the single-family post & beam home in Japan. The first is a move to non-wood housing as a result of a steady population migration to large cities such as Tokyo. In these large cities, housing is not surprisingly dominated by high-rise apartments, or "mansions" as they are referred to in Japan. As illustrated in Figure 9, wooden housing starts as a percent of total starts declined from 70-80% in the 1970s to 40-45% in the 1990s.

The second trend, shown amplified in Figure 10, is the growing number of platform-frame (2x4) housing starts. Due in no small part to the successful efforts of the Council of Forest Industries, this has created a demand for BC Interior and east of the Rockies dimension lumber (nominal 2x4s, 2x6s, etc.) and structural panels. Unlike the dimension lumber used in North America, however, a proprietary "J-grade" evolved,

Typical post & beam housing structure in Japan

which in essence requires aesthetic attributes of the lumber as well as structural. This grade offers considerable price premiums over the North American construction grades, giving Canadian suppliers another opportunity to increase the value of its resource.

Figure 9
Japan housing starts, wood and non-wood

Platform-frame (2x4)

Post & Beam and Wooden Pre-fab

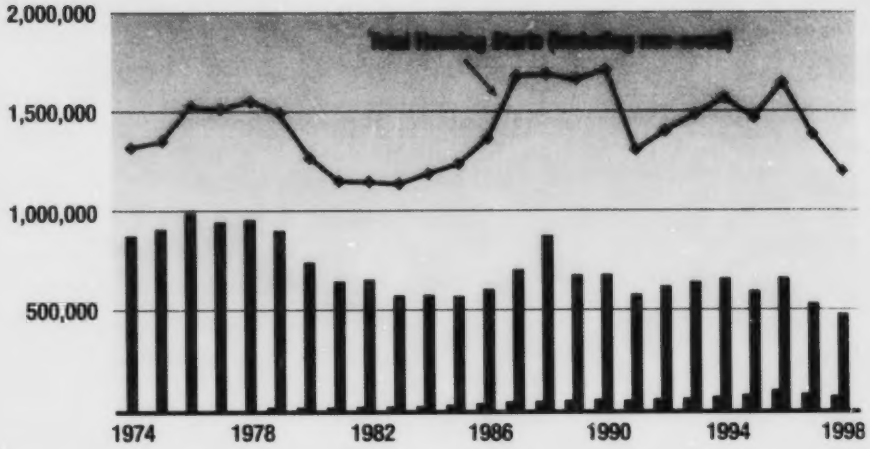
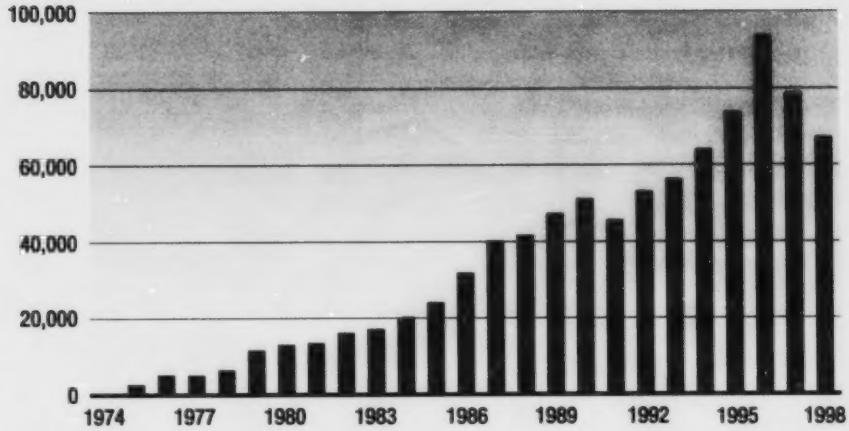


Figure 10
Japan platform-frame housing starts



PRODUCT OPPORTUNITY

- Growing demand for "J-Grade" construction lumber and panels
- Japanese have been shown to be more likely to specify Canadian products on platform-frame homes, including doors and windows (size issue) and interior finish and furniture (style issue)

PRODUCT THREAT

- Scandinavian and Japanese domestic production of dimension lumber based on Japan's acceptance of NLGA grading standards

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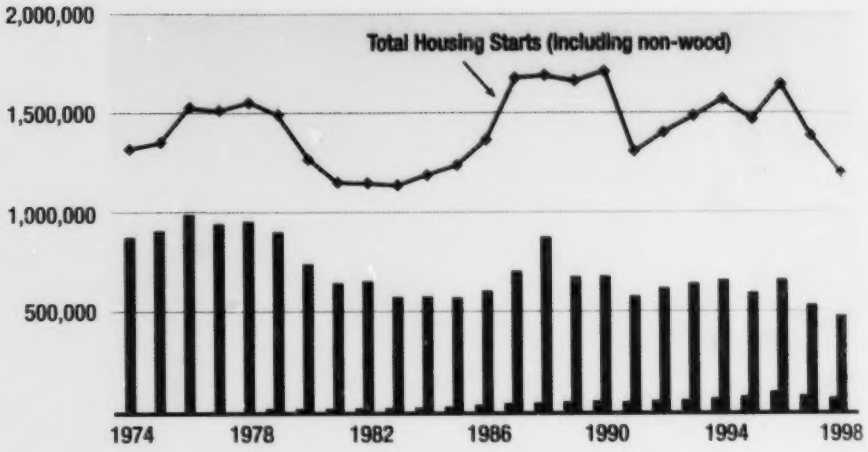

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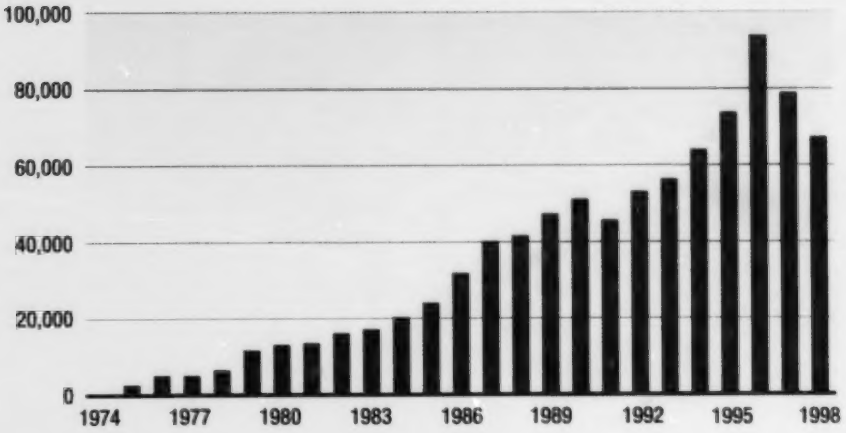

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TREND 5

Japan post & beam home construction moves to "pre-cut"

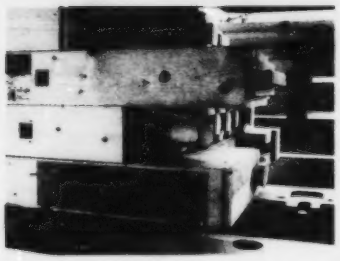
In the previous section, the traditional post & beam home in Japan was described as using green lumber components with joinery hand chiseled by master carpenters. Due to a number of related trends, including the growing age of the average master carpenter in Japan (due in part to the lack of interest in younger generations to maintain this highly skilled profession) and the government of Japan's desire to see the cost of finished homes decline, there has been an almost over-night trend toward automating the creation of the joinery in a factory environment. The most significant impact of this dramatic trend has been a change from the use of green lumber to kiln-dried lumber. The reason for this is that the detailed joinery is less likely to fit with the changes in moisture content from the factory environment to the on-site installation.

"The most significant impact of this dramatic trend has been a change from the use of green lumber to kiln-dried lumber."

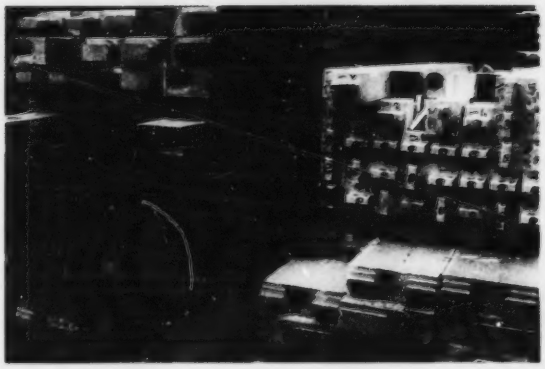
PRODUCT OPPORTUNITY

- Pre-cut posts and beams can be either dried solid lumber or glulam (see Trend 6). On the solid wood side, Canadian suppliers have opportunities with kiln-dried hem-fir and Douglas-fir, as well as for a "premium" solid SPF member. The market research from this study revealed an overall preference for solid kiln-dried members over engineered members, both for vertical and horizontal applications.
- Opportunities for continued growth in Canadian lamstock (see Trend 6).

"Japan's drying capacity is below 10% [of demand] nationwide."
Japan Lumber Journal



"Pre-cut" post & beam home components

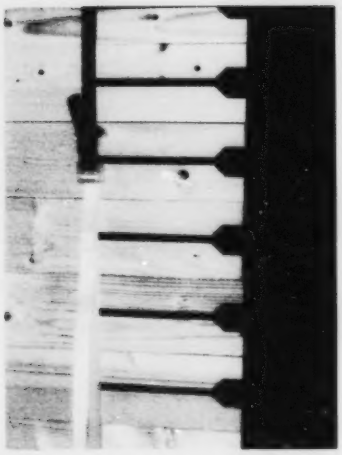


"The number of pre-cut plants [in Japan] increased from 181 in 1986 to 890 in 1998. The number of housing units supplied has grown even more rapidly, from 23,000 units in 1986 to 210,000 in 1998."

Softwood Export Council, Portland, Oregon.

6

Japan post & beam home construction moves to engineered wood products



Glue-laminated beams with pre-cut slots to accept metal connectors

Along with the move toward pre-cut post & beam wood components, Japan has rapidly adopted the use of laminated lumber for both vertical and horizontal applications. In fact, while the market research showed an overall preference for kiln-dried solid wood, engineered wood products came in a very close second (Figure 11). In 1999, laminated posts held 66.2% of the market share and 29.0% for beams (Japan Lumber Reports).

Type Preferences (out of 7)	
green solid horizontal	2.6
dry solid horizontal	5.8
lam lumber horizontal	5.3
green solid vertical	2.5
dry solid vertical	5.8
lam lumber vertical	5.1

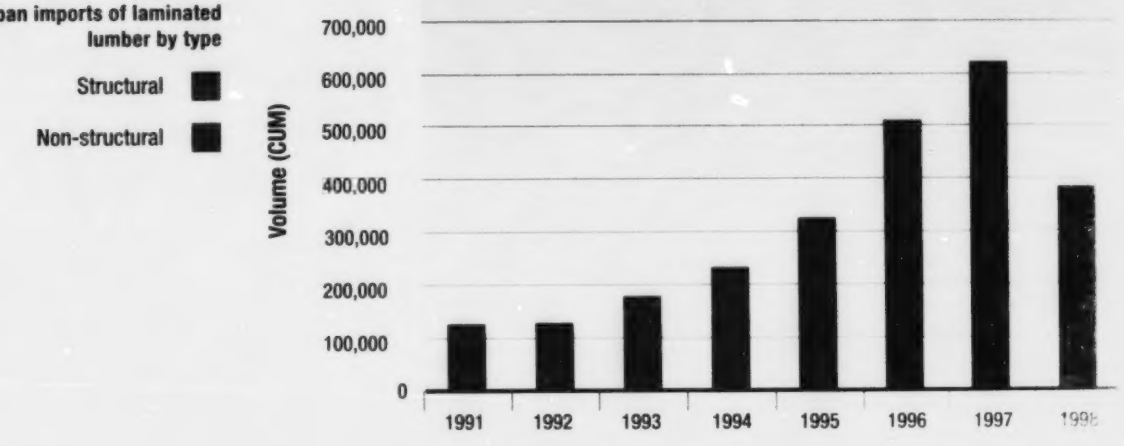
Figure 11

Japan builder preference for post & beam construction members

This trend, combined with the movement away from green lumber (also evident in Figure 11), has had a profound impact on the BC Coast producers of hem-fir lumber for the Japanese post & beam market. While green hem-fir had a dominant position in vertical post applications, this has been badly eroded in recent years in favor of domestic Japanese species and glue-laminated posts (with 1999 market share at only 4.5%; Japan Lumber Reports). Initially, the Japanese imported the glulam, partially from the U.S., Scandinavia and other parts of Western Europe for structural purposes, and from the South Seas for non-structural. Over time, Japan developed its own glulam production capacity, and the demand gradually shifted to the import of lamstock, again largely from Scandinavia and other parts of Western Europe (most notably, Austria). It is interesting to note that Japanese domestic species are not typically used for their glulam production, with imported

Figure 12

Japan imports of laminated lumber by type



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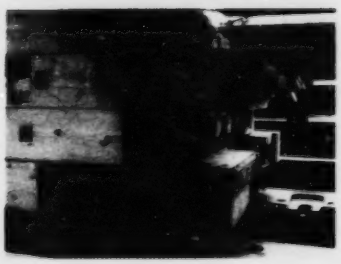

"Pre-cut" post & beam home components

PRODUCT OPPORTUNITY

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- Opportunities for continued growth in Canadian lamstock (see Trend 6).

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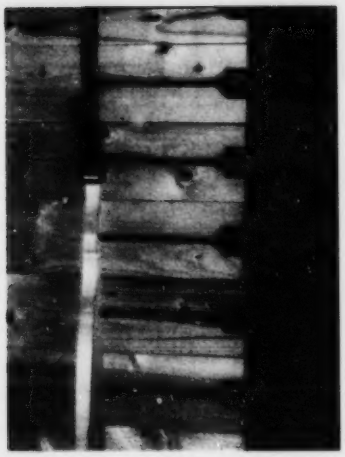

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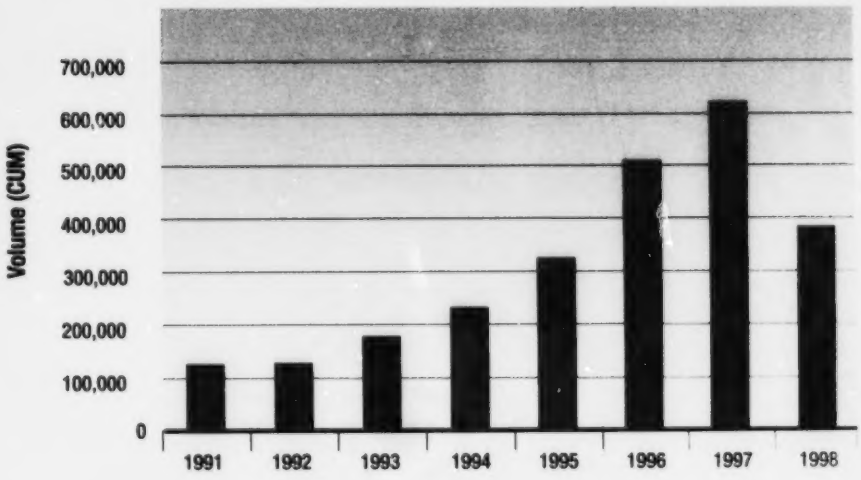


lamstock accounting for more than 90% of the furnish. Figure 12 shows the trends in the import of laminated lumber, both for structural and non-structural applications. Figure 13 breaks down the country of export for the structural alone.

Figure 13
Japan imports of structural laminated lumber by source
Japan Tariff Association

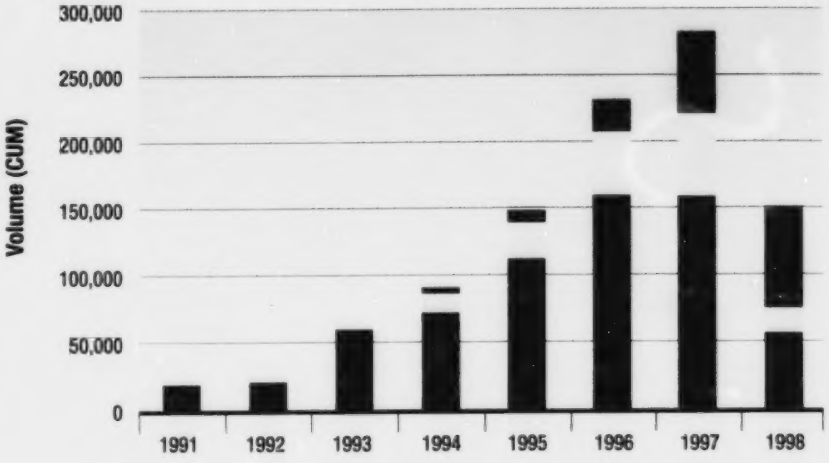
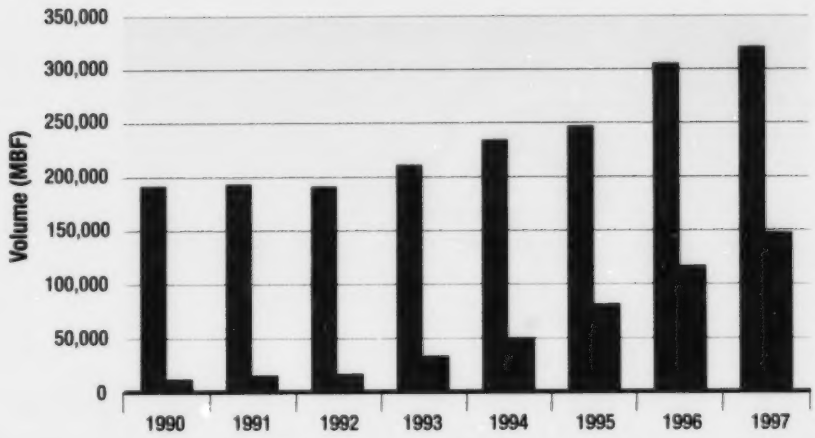


Figure 14
Japan production and imports of glulam
Japan Glulam Association

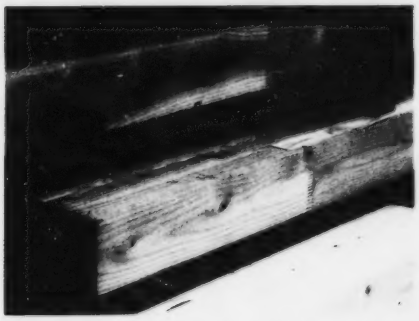


PRODUCT OPPORTUNITY

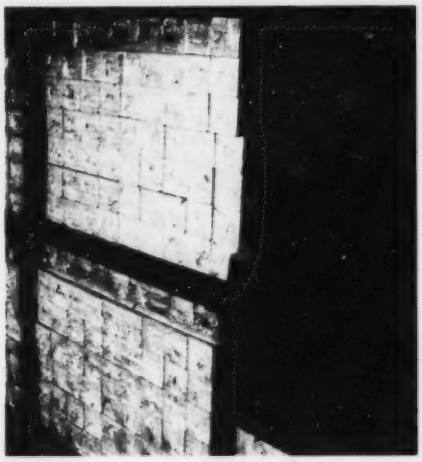
- Lamstock
- Hemlock LVL

Parts of Japan, even more so than the U.S. South, have serious termite populations to deal with. As a result, there exist opportunities for:

- Treated lamstock
- Treated glulam



Finger-jointed, glue-laminated Douglas-fir



Decorative posts; glulam made from Scandinavian spruce, then laminated with Japanese Hinoki (note the individual plastic wrapping)

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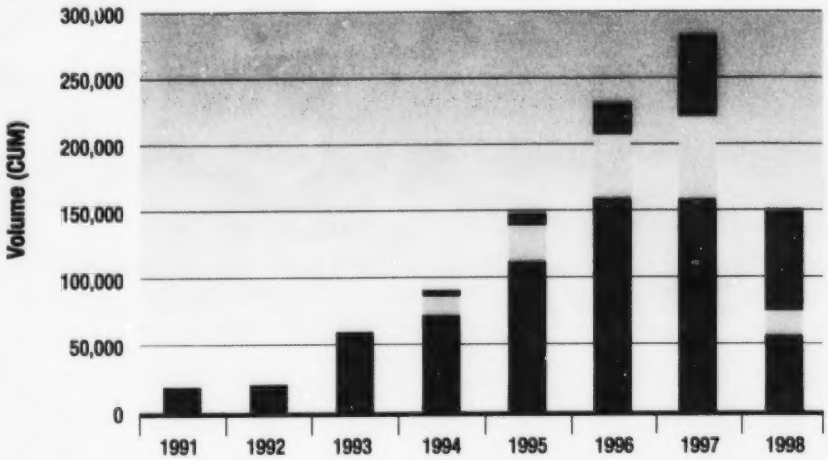
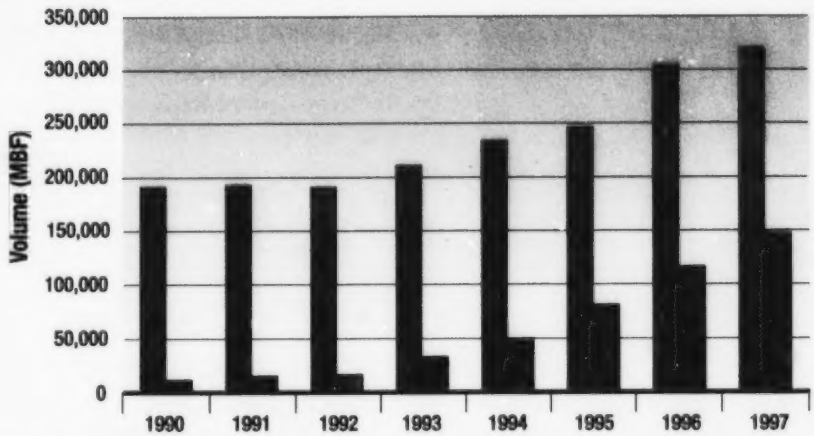


Figure 14
Japan production and imports of glulam
Japan Glulam Association



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- Treated glulam

Finger-jointed, glue-laminated Douglas-fir

Decorative posts; glulam made from Scandinavian spruce, then laminated with Japanese Hinoki (note the individual plastic wrapping)

7

Japan experiments with a "hybrid" construction style

The traditional post & beam home has evolved over the century, but this evolution has turned into a near revolution! As a result of most of the trends outlined in this report, a lot of the traditions are being challenged, both in terms of style and construction techniques.

Use of metal connectors and hanging braces as a complement to, or in this case, a replacement for traditional joinery

As mentioned earlier, the very traditional post & beam construction style made exclusive use of joinery to connect the structural components, as opposed to nails and metal connectors. As a result of cost savings, the lack of master carpenters, and the now strong demand for performance as a result of the Kobe earthquake, this led to pre-cut components and glulam as discussed in the previous two sections. This also fueled the already growing demand for North American platform-frame construction. The next step was the emergence of the hybrid construction technique.

The hybrid system essentially takes the best of both the post & beam and platform-frame construction techniques. There are many forms of hybrid construction, and all of the lines between construction techniques are becoming very fuzzy. Examples include:

- Adding plywood or OSB sheathing to post & beam structures to offer lateral load resistance (traditional post & beam structures sometimes make use of cross-bracing, but not sheathing). This is sometimes the case for all of the exterior walls, and sometimes only on the corners of the structure.

- Part of the shift to hybrid is to use vertical members between the posts as structural members for exterior and interior walls (what the Japanese refer to as mabashira). The increasing size of houses and the evolving need for privacy have increased wood use to create room separations in Japanese houses (accommodating the trend toward multi-generational homes).

Vertical members between the posts as structural members for exterior and interior walls (note the Canada Tsuga stamp)

- Use of metal connectors and hanging braces as a complement to, or even a replacement of traditional joinery. This is by far the most radical departure from traditional post & beam construction.
- The use of panelized construction components, including simple wall framing and insulated panels.

PRODUCT OPPORTUNITY

Potential for increased:

- Sales of Canadian Structural Plywood and oriented strand board (OSB)
- BC Interior/East of the Rockies dimension lumber for hybrid post & beam homes
- BC Coast kiln-dried construction lumber for hybrid platform-frame homes
- Canadian exports of wall and floor systems, including pre-fabricated inserts for post & beam homes, both for new starts and for retro-fitting existing homes
- Opportunity for more highly engineered and innovative panelized houses

An example of pre-manufactured, insulated wall inserts to a post & beam structure

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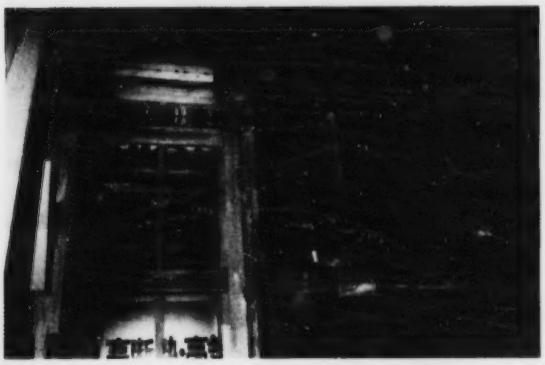


An example of pre-manufactured, insulated wall inserts to a post & beam structure

TREND

8

Number of multi-family* wood homes poised to increase

While the number of wooden multi-family units has NOT been a positive trend to date (see Figures 15 and 16), the market research performed by the authors did suggest that this may soon change. As shown in Figure 17, the connected row house was selected 20% of the time in the "choice-based" portion of the market research with builders, which is *considerably* higher than the percentage being built today.

*In Japan, "multi-family" is often taken to mean "multi-generational." What is meant here however, is three- to four-story apartment or townhouse units.

The potential for increased multi-family units can be attributed to growing senior housing, the offering of a lower cost alternative to single family detached homes, and changing fire regulations. ***The latter includes the allowance of 3-4 story multi-family platform-frame structures in semi-urban areas—the so called "quasi-fire zones."*** Also, while land ownership patterns in urban centres have been an impediment to multi-family complexes, the shift to rural suburbs is alleviating this problem.

Figure 15
Japan multi-family starts
Japan Ministry of Construction

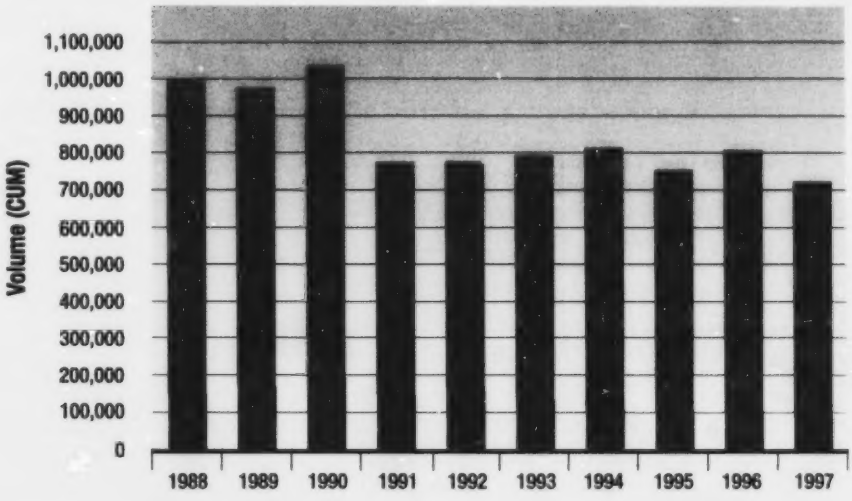


Figure 16
Japan "row" house starts
Japan Ministry of Construction

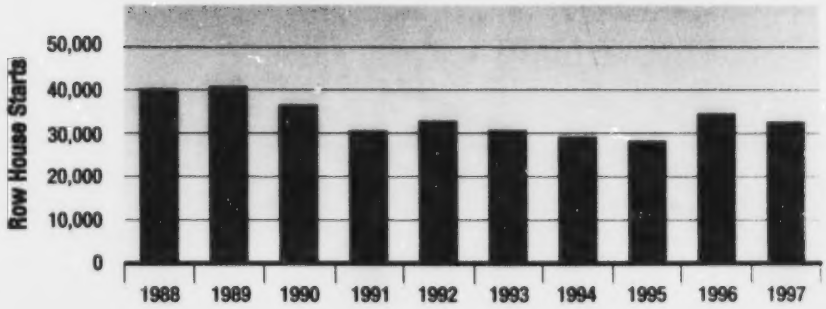


Figure 17

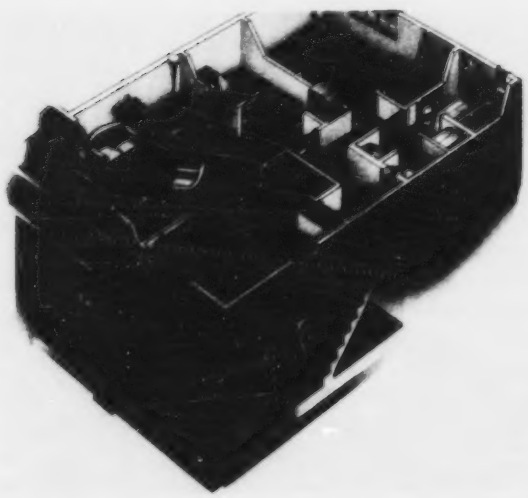
Sample "choice-based" results from builder interviews in Japan.

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	27.2	[illegible]	27.1
[illegible]	22.0	[illegible]	20.9
[illegible]	20.3	Other wood	23.3
Price		**Construction Method**	
300,000 Yen/tsubo	19.5%	Post & Beam (traditional)	50.4%
400,000 Yen/tsubo	30.5	2x4 Platform Frame	18.2
500,000 Yen/tsubo	28.2	Hybrid (mix Post & Beam and 2x4)	31.4
600,000 Yen/tsubo	21.8		
Wood Distributor		**Durability**	
Local retailer	20.2%	House will last 20 years	12.4%
Local wholesaler	20.3	House will last 30 years	25.5
Local pre-cutter	21.1	House will last 40 years	29.7
National supplier/trading house	17.7	House will last 50 years	32.4
Many different sources	20.8		

PRODUCT OPPORTUNITY

Potential for increased sales of Canadian construction lumber, structural panels, systems and interior finish with any increase in the number of multi-family units. As was the case with single-family detached platform-frame homes, this could be marketed as a Canadian system, specifying Canadian product.

These photos and illustration of multi-family rental units reprinted with permission from Trans-Pac Housing Inc. , Burnaby, BC, a supplier of Canadian building materials and components to Japan



TREND

9

Government of Japan's desire to reduce home costs

The government of Japan has had a number of initiatives since World War II to improve the living standards of its population. Seven "Five Year Housing Construction Plans" have been in effect, the last of which covered the years 1996-2000.

> "This plan aims at promoting construction policies that will improve living conditions for all Japanese whose average life expectancy is now over 80 years, so that people can live in houses that fit their lifestyle in the coming century."

"Japan has a goal to reduce the cost of building a standard house by 30%."

The basic intent of this plan is to increase the quality of living in a country where much of its population is living under conditions that are not consistent with the increase in prosperity that Japan has enjoyed since the war. One of the objectives that the government identified to achieve this goal was to reduce housing construction costs. To this end, in December 1995, the government announced an "Action Plan" as part of its Economic and Social Restructuring plan to reduce the cost of building a standard house by 30% by the year 2000.

While it is doubtful that this goal will be reached, partially because of the drop in the purchase power of the yen over this period, a lot of the trends discussed in this report have contributed to reduced construction costs. These have included the move away from labor intensive joinery crafted on-site for post & beam homes (the move to kiln-dried, pre-cut building components), the growing use of platform-frame construction, use of more (less expensive) imported material, and even growing imports of prefabricated and fully manufactured homes.

To demonstrate just how expensive home construction is in Japan relative to North America, *even for the platform-frame construction technique*, Figure 18 shows the result of a recent study from the Center for International Trade in Forest Products at the University of Washington. The figure shows that a comparable size and style of home built in the Pacific Northwest of the U.S. is less than one half that in Japan utilizing Japanese carpenters and maximizing the use of Japanese building materials.

Figure 18
Summary of total platform-frame construction costs in yen for three U.S./Japan scenarios
CINTRAFOR Working Paper 68, 1998

Case 1			Case 2			Case 3		
US Carpenters/US Materials			J. Carpenters/J. Materials			J. Carpenters/Max. US Mat'l		
Material	Labor	Total	Material	Labor	Total	Material	Labor	Total
¥5,373,124	¥4,011,913	¥9,385,037	¥15,936,916	¥6,551,498	¥22,488,414	¥12,842,132	¥6,044,674	¥18,886,806

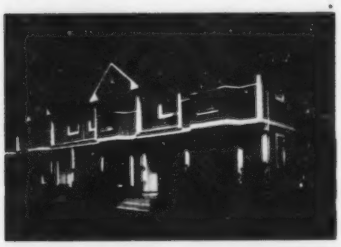
Figure 17
Sample "choice-based" results from builder interviews in Japan.

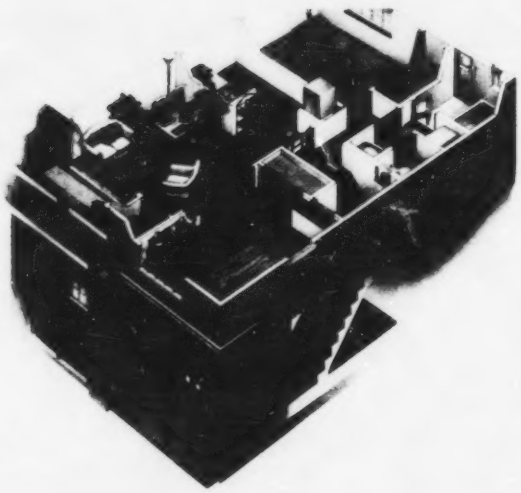
Type of House		Wood	
2-story detached	30.5%	Japanese wood	28.7%
3-story attached	27.2	Canadian (N.A.) wood	27.1
connected row house	22.0	European wood	20.9
apartment	20.3	Other wood	23.3
Price		**Construction Method**	
300,000 Yen/tsubo	19.5%	Post & Beam (traditional)	50.4%
400,000 Yen/tsubo	30.5	2x4 Platform Frame	18.2
500,000 Yen/tsubo	28.2	Hybrid (mix Post & Beam and 2x4)	31.4
600,000 Yen/tsubo	21.8		
Wood Distributor		**Durability**	
Local retailer	20.2%	House will last 20 years	12.4%
Local wholesaler	20.3	House will last 30 years	25.5
Local pre-cutter	21.1	House will last 40 years	29.7
National supplier/trading house	17.7	House will last 50 years	32.4
Many different sources	20.8		

PRODUCT OPPORTUNITY

Potential for increased sales of Canadian construction lumber, structural panels, systems and interior finish with any increase in the number of multi-family units. As was the case with single-family detached platform-frame homes, this could be marketed as a Canadian system, specifying Canadian product.

These photos and illustration of multi-family rental units reprinted with permission from Trans-Pac Housing Inc. , Burnaby, BC, a supplier of Canadian building materials and components to Japan





TREND

9

Government of Japan's desire to reduce home costs

"Japan has a goal to reduce the cost of building a standard house by 30%."

The government of Japan has had a number of initiatives since World War II to improve the living standards of its population. Seven "Five Year Housing Construction Plans" have been in effect, the last of which covered the years 1996-2000.

> "This plan aims at promoting construction policies that will improve living conditions for all Japanese whose average life expectancy is now over 80 years, so that people can live in houses that fit their lifestyle in the coming century."

The basic intent of this plan is to increase the quality of living in a country where much of its population is living under conditions that are not consistent with the increase in prosperity that Japan has enjoyed since the war. One of the objectives that the government identified to achieve this goal was to reduce housing construction costs. To this end, in December 1995, the government announced an "Action Plan" as part of its Economic and Social Restructuring plan to reduce the cost of building a standard house by 30% by the year 2000.

While it is doubtful that this goal will be reached, partially because of the drop in the purchase power of the yen over this period, a lot of the trends discussed in this report have contributed to reduced construction costs. These have included the move away from labor intensive joinery crafted on-site for post & beam homes (the move to kiln-dried, pre-cut building components), the growing use of platform-frame construction, use of more (less expensive) imported material, and even growing imports of prefabricated and fully manufactured homes.

To demonstrate just how expensive home construction is in Japan relative to North America, *even for the platform-frame construction technique*, Figure 18 shows the result of a recent study from the Center for International Trade in Forest Products at the University of Washington. The figure shows that a comparable size and style of home built in the Pacific Northwest of the U.S. is less than one half that in Japan utilizing Japanese carpenters and maximizing the use of Japanese building materials.

Figure 18
Summary of total platform-frame construction costs in yen for three U.S./Japan scenarios
CINTRAFOR Working Paper 68, 1998

Case 1			Case 2			Case 3		
US Carpenters/US Materials			J. Carpenters/J. Materials			J. Carpenters/Max. US Mat'l		
Material	Labor	Total	Material	Labor	Total	Material	Labor	Total
¥5,373,124	¥4,011,913	¥9,385,037	¥15,936,916	¥6,551,498	¥22,488,414	¥12,842,132	¥6,044,674	¥18,886,806

Figure 19

Wooden prefabricated housing starts in Japan

Japan Wood-Products Information and Research Center (JAWIC)

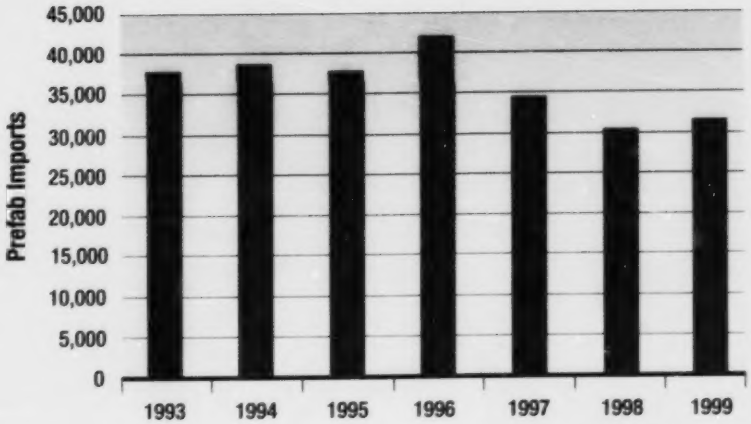
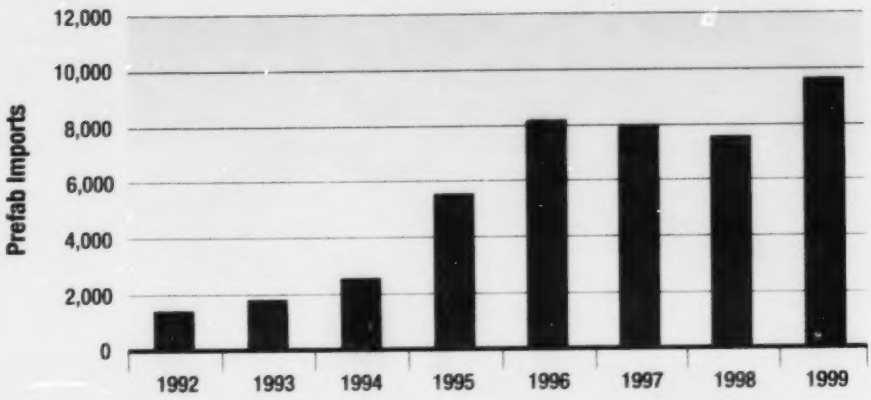


Figure 20

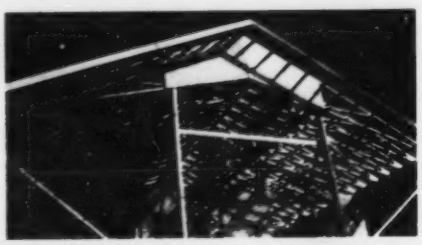
Japan imports of prefabricated homes

Japan Lumber Journal



PRODUCT OPPORTUNITY

- Increased opportunity for manufactured home exports, as well as pre-fabricated components
- Continued exports of lower cost Canadian construction lumber and panels (as compared to Japanese material), AND platform-frame building expertise



TREND

10

Revisions to the *Building Standards Law* drives performance

PRODUCT OPPORTUNITY

Prescriptive-based building codes combined with ISO harmonization will open up the Japanese market to foreign producers of building products and systems.

The 10-year warranty requirement is likely to cause builders to use more and more kiln-dried and engineered wood components to avoid drying related defects.

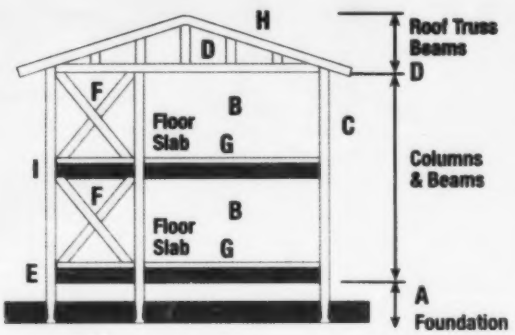
Opportunities exist for:

- **Glulam**
- **Lamstock**
- **Kiln-dried solid posts and beams of Douglas-fir, hemlock, and SPF**
- **Performance labeling systems**

The Building Standards Law of 1950 (BSL) governs residential construction in Japan. The original BSL was based on prescriptive standards for building products and construction methods. However, in 1998 the BSL was revised to adopt performance based criteria for residential construction. In conjunction with these revisions the Housing Quality Assurance Law of 1999 (HQAL) was introduced which, among other things, included a mandatory 10-year warranty period on new construction. These changes become effective in June 2000.

Performance based criteria will hypothetically open the Japanese market to more imported products and non-traditional building systems. To facilitate this, the Ministry of Construction is working to harmonize its testing methods with the International Standards Organization (ISO). It is intended that, in the future, Canadian building products and systems will undergo testing in Canada for certification in Japan.

The Housing Quality Assurance Law provides both opportunities and threats to Canadian wood products. The threat is that due to the 10-year warranty requirement on wood structural framing (See Figure 21) the demand for green lumber will further decline. However, the move to engineered and kiln-dried materials is also an opportunity. Even with a growing domestic glulam industry, Japan was still importing glulam before the HQAL was introduced. Even if domestic production of glulam increases Japan will still rely heavily on lamstock imports, as domestic supplies are less than 10% of demand. Japan also has a limited domestic kiln-drying capacity for solid wood.



Foundations	A
Walls	B
Columns	C
Roof Trusses	D
Sills	E
Diagonal Members	F
Floor Slabs	G
Roof Slabs	H
Horizontal Members	I

Figure 21
Housing components for which 10 year liability is mandatory
Japan Ministry of Construction

Figure 19

Wooden prefabricated housing starts in Japan

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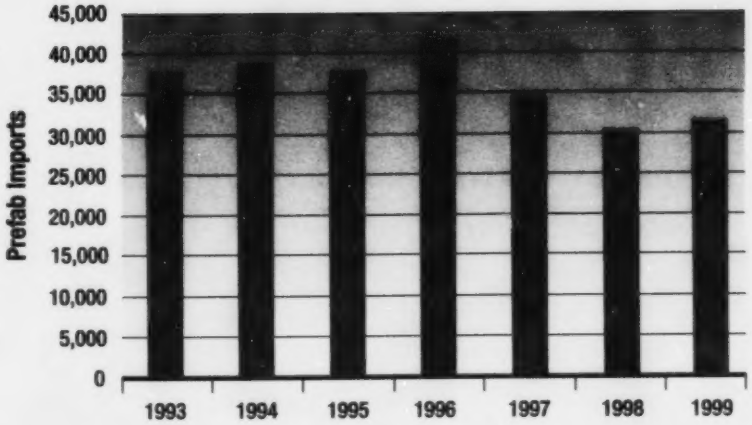

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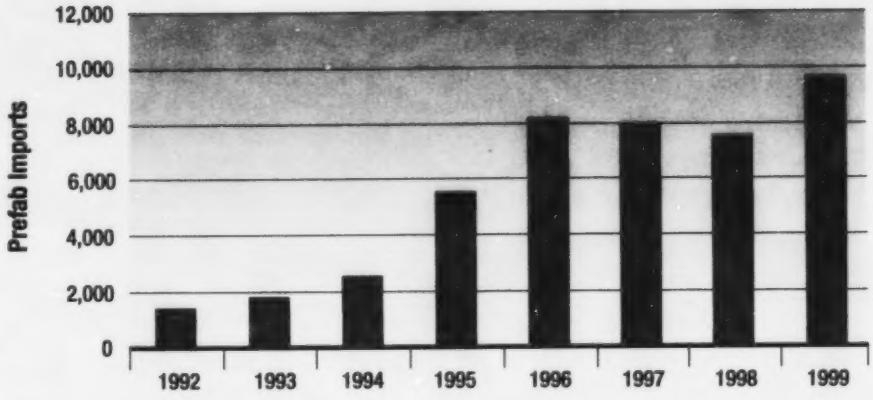

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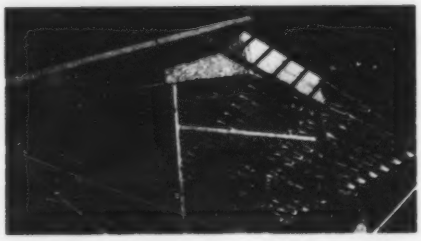

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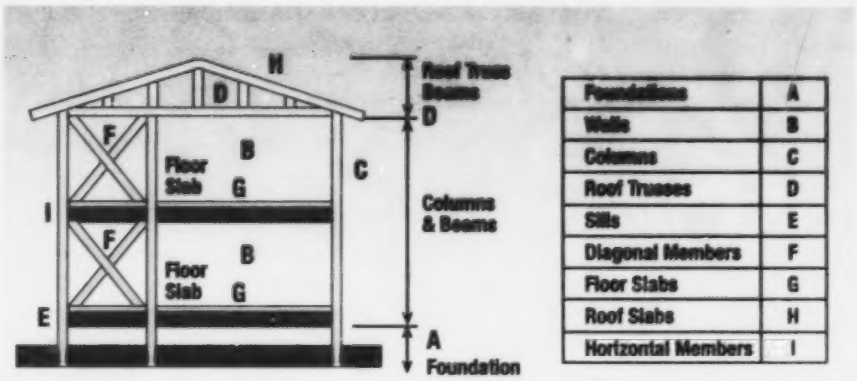


Figure 21
Housing components for which 10 year liability is mandatory
Japan Ministry of Construction

TREND 11

Secondary wood product demand changes

Wood has always been an important material for interior finish and furniture products in Japan. More importantly, in recent years preferences for these secondary wood products have shifted in favor of North American supply.

Wood furniture

In the furniture segment, over 60% of consumers surveyed expect that North American casual designs will grow in popularity in the future. Further, color preferences for furniture are strongest for light and very light wood. These preferences match the Canadian wood resource and furniture industry very well.

For years, Scandinavian and fine European-designed furniture has consistently captured market share at the expense of dark and formal Japanese furniture. The trends of moving from floor cushions to chairs, from tatami mats to carpet, from low tables to dining room tables created opportunities for imported furniture or domestic furniture that used imported design. The Japanese consumer and designer are now very interested in "North American Casual." The light pine colours and natural design characteristics make this style of furniture attractive to the more global Japanese consumer of the 21st century.

Research results indicate that both consumers and designers expect casual North American furniture use to grow much more rapidly than Scandinavian, fine European or Japanese styles. Wood furniture is preferred over metal or plastic (Figure 22). The Japanese consider North American casual most suitable for the living room and bedrooms but not for the dining room where Scandinavian or fine European is preferred. Furniture sizes (depth, rise and length) need to be adjusted for the smaller Japanese body and the more compact houses.

Results indicate that prices should be competitive with current prices for Scandinavian furniture. Any lowering of price will result in a consumer assumption of a corresponding lowering of quality.

Outdoor furnishings and decking

The use of outdoor space for family use is growing in Japan. Traditionally, gardens were located in private spaces such as courtyards. Once western style housing became popular, families no longer used exterior spaces due to the lack of privacy. A recent trend has been the family use of exterior space despite the lack of privacy. The younger generation is now looking to use the small yards and garden space by purchasing outdoor furnishings. This trend combined with the proven preference for wood but the desire for low maintenance suggests opportunities for Canadian exterior furnishings, from decking to furniture.

For outdoor living products, low maintenance is key. While Japanese Sugi is the material of choice, western red cedar is the most preferred imported material.

PRODUCT OPPORTUNITY

- Resized pine living room and bedroom furniture, priced equivalent to Scandinavian furniture
- Hemlock furniture
- Artistic, design oriented "natural" furniture
- A product quality label would be perceived very positively
- Pre-finished outdoor cedar furniture (ensure that it is easy to store and light to carry)
- Small gazebo, decking, and walkways from cedar or other natural light-weight material
- Matched decking, fencing and outdoor furnishings
- Low maintenance is of key importance

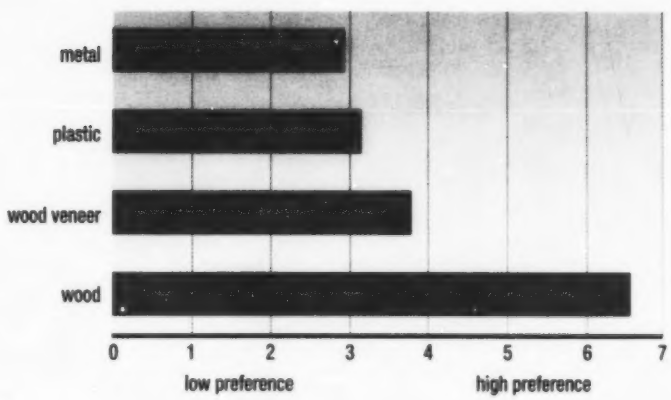
Interior finish

The same types of preferences are emerging for interior finish as for furniture. Light colors are now preferred over traditional dark finishes inside the home. Further, solid wood is the preferred material for interior finish. Consumers, designers, and builders all agree that floors are the most favored place for wood finish. This is likely due to a combination of the style and health attributes of wood floors. Stairs, doors, and wainscoting are also popular.

Over 50% of all floors in 1996 were covered by either composite or solid wood flooring. This proportion is growing as Japanese consumers move away from materials which support mites and impact indoor air quality. Composite floors, either covered by veneer or paper overlay dominate this market. These are mostly produced in Japan by very large and well-connected manufacturing firms. Solid wood floors account for only 5% of the wood flooring market, are mostly produced by small rural manufacturers, and used in public buildings such as hospitals and schools. However, there has recently been increased interest and installation of solid wood floors in residential housing, due to both concerns over health and the general adoption of western style house designs.

Not only is wood the preferred finish for most interior applications (Figure 22), wood floors are expected to continue to increase their market share over the next five years.

Figure 22
Consumers' material preference for interior finish



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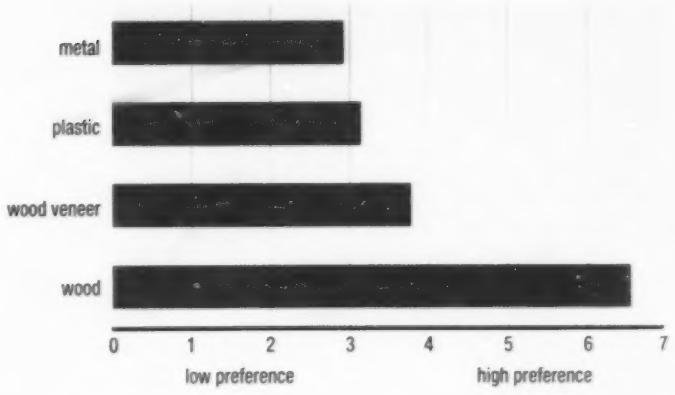
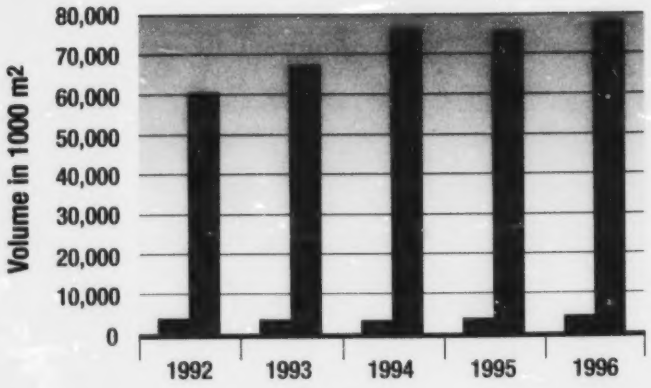


Figure 23
Volume of solid and composite wood flooring market



This bodes well for North American producers of softwood flooring since the Japanese do not require the same degree of hardness that is necessary in North America. Tradition still results in almost all Japanese removing their shoes at the entrance of the house and wearing soft slippers inside. Thus, many softwood species (such as hemlock) could be considered as flooring for Japan.

There is a general shift back to using wood for interior finish in Japanese houses. Most of the wood items were replaced by plastic, vinyl and metal over the past several decades. Recent studies show this trend reversing and the consumer returning to the use of wood both in new houses and in renovation (called reform in Japan). There are existing markets for light coloured wood used for wainscoting. Information on defect level and distribution, as well as a commitment to the market, are all that is needed for

Figure 24
Canada exports of wood windows
Statistics Canada

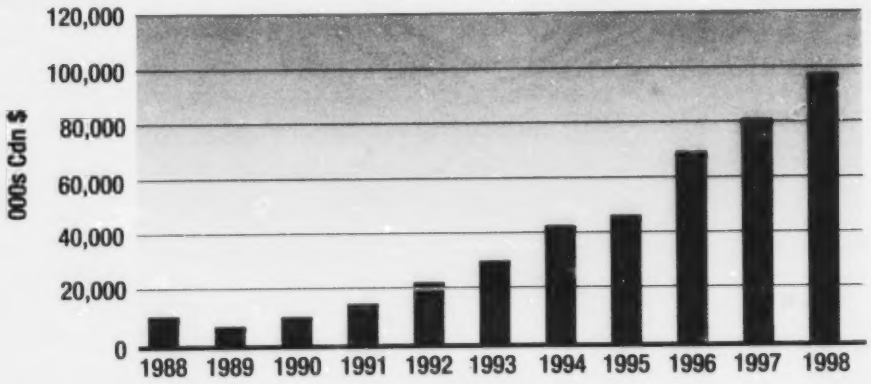
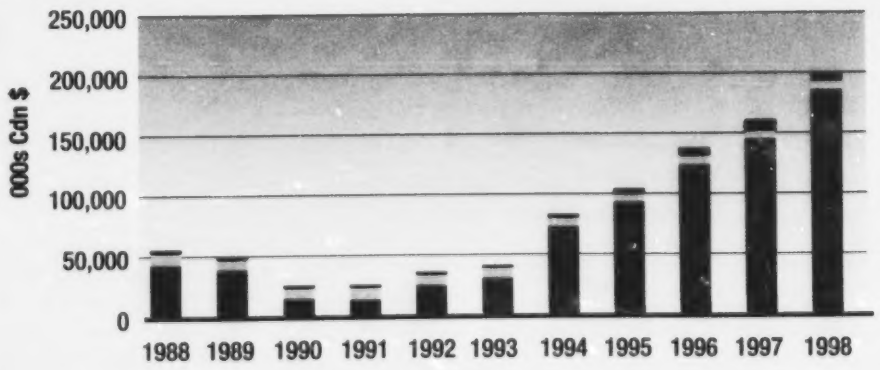
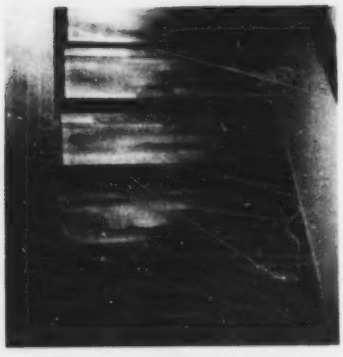


Figure 25
Canada exports of wood doors
Statistics Canada



Japanese solid Hinoki flooring



Solid Douglas-fir edge-glued stairs

a Canadian firm to enter the market since the manufacturing capacity already exists in Canada. Stairways and stair railings also provide opportunities for increased use of Canadian softwoods due to the light colour and the expected growth in these product areas. Natural finishes for existing interior products will differentiate Canadian products from the competition. The use of wood mouldings is expected to shrink over the next five years and is subject to intense competition both from tropical hardwoods and radiata pine.

There has been growth in the repair and remodeling sector, specifically for kitchens and bathrooms due to water damage. Most work is completed by small contractors or builders with a lack of full-time house projects. In addition there is increased remodeling of office buildings as telecommunications and computer use demand adjustments in layout and design of traditionally spartan office space.

Opportunities also exist for items such as doors and windows. While Canadian exports of these items are growing the fastest for the U.S., sales have been increasing in recent years to Japan (Figures 24 and 25). Opportunities are particularly strong for platform-frame homes being built in Japan due to size compatibility.

PRODUCT OPPORTUNITY

- Composite wood flooring
- Solid wood flooring with an "easy to install" procedure
- All flooring should be light coloured and can include "minor defects" such as knots (see photograph)
- Light coloured wainscoting both for new construction and some repair and remodeling
- Practical office furniture that incorporates wood
- Low cost, easy to install kitchens suitable for remodeling (offering custom design cabinets for space that is being remodeled)
- Doors, windows, cabinets, and other similar finishing products, particularly for platform-frame construction

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TREND

12

Japan's post-war plantations come on stream

"Japanese supply must never be overlooked as competition for Canadian wood products, especially if the Japanese yen loses strength!"

Not unlike British Columbia, approximately 70 percent of Japan's 37 million hectares is covered by forests. Of the total forest land in Japan, there are 13.67 million hectares of natural forests (54%), 10.22 million hectares of man-made forests (40%), with the balance being either unstocked land or bamboo groves (1.37 million hectares, or 6%). The natural forest area consists of 75% deciduous species, 13% coniferous species and 12% mixed forests. In contrast, 98% of the man-made forest is coniferous. Ten percent of the area is larch, 11% is pine, 24% is Hinoki, 45% Sugi, 9% is spruce and fir, and 1% miscellaneous.

The growing stock of the natural forests is roughly 1.5 billion cubic metres compared to roughly 1.4 billion cubic metres in the man-made forests. The man-made forests are primarily a product of extensive planting which took place in the one to two decades following World War II. Annual growth of the plantations is roughly 76 million cubic metres, or a mean annual increment (MAI) of 7.5 cubic metres per hectare. Figure 26 shows the age distribution of these trees.

Japan's annual harvest ranges either side of 30 million cubic metres, with roughly 60% being harvested from the man-made forests. This is down from the peak seen in the 1950 of over 50 million cubic metres. However, as shown in Figure 26, the volume harvested can be expected to increase significantly in the near term.

In spite of this impressive growth rate of their man-made forests, it has been suggested that the quality of the timber from these stands is not high, particularly in terms of inadequate log diameters due to a noted lack of tree spacing (Iwai, 1986). This is illus-

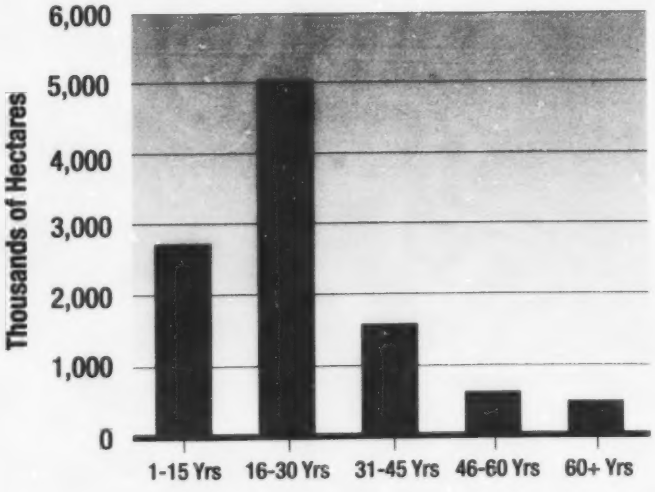


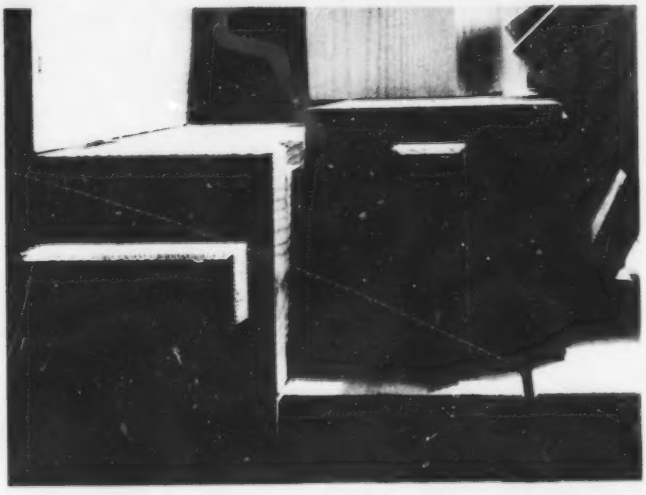
Figure 26
Distribution of Japanese plantations by age class, 1986.
Japan Forest Agency, 1991

trated in the top two photos below, showing typical posts made from plantation Sugi. The bottom photo shows the use of "V" cuts in these posts to minimize cracks in drying.

Having said this, the Japanese are very protective of their domestic industry, and end-users seem to have a preference for domestic species. In short, Japanese supply must never be overlooked as competition for Canadian wood products, especially if the Japanese yen loses strength!

Japan solid Sugi pre-cut posts

Japan solid Sugi posts; note the high percentage of heartwood



Japan solid Sugi post with "V" cut, along with 5-ply glulam posts

TREND

13

Wood product trade becomes more global

Canada has clearly enjoyed the dominant position in terms of softwood lumber exports to Japan over the past decade. But with the overall drop in 1998 imports aside (due to the economy-led drop in housing starts), other players have been making strong inroads, particularly Scandinavia (Figures 27-28).

If ten years ago someone had said that Sweden, Finland, and more recently Austria would be competing with Canada and the U.S. in Japan, they would have been thought crazy! How could a country with three to four weeks' boat transport time to Japan compete with the one week from western North America?

Figure 27
Japan imports of softwood lumber by country, volume
Japan Tariff Association

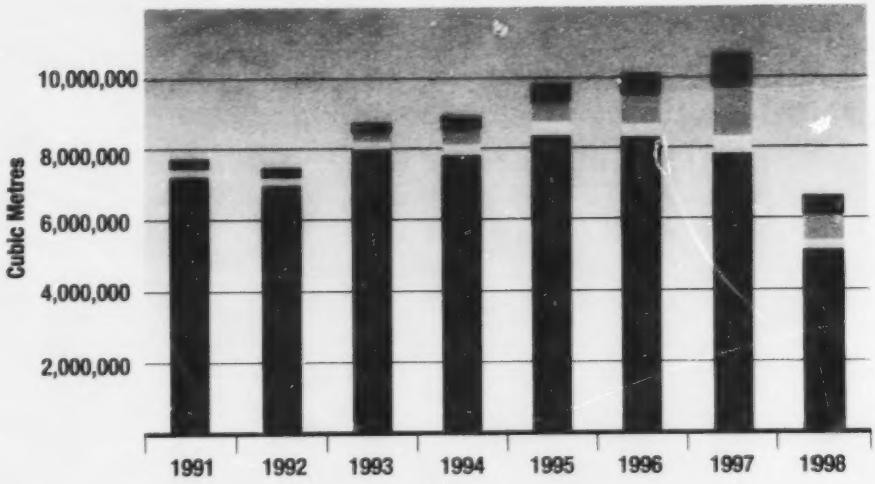
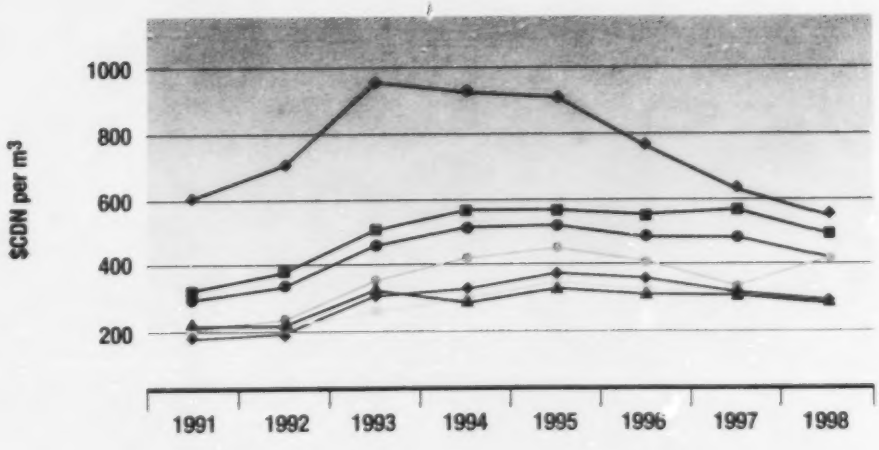


Figure 28
Japan imports of softwood lumber by country, unit value
Japan Tariff Association



Obviously, things change. Relative exchange rates began favoring Scandinavia over the U.S. dollar. Aggressive marketing by Scandinavia insured that they were delivering the product that the Japanese wanted. Transportation cost advantages were sought with "back-hauls." And in recent years, the cost of Western Canadian logs rose dramatically as compared to Scandinavia and other parts of the world.

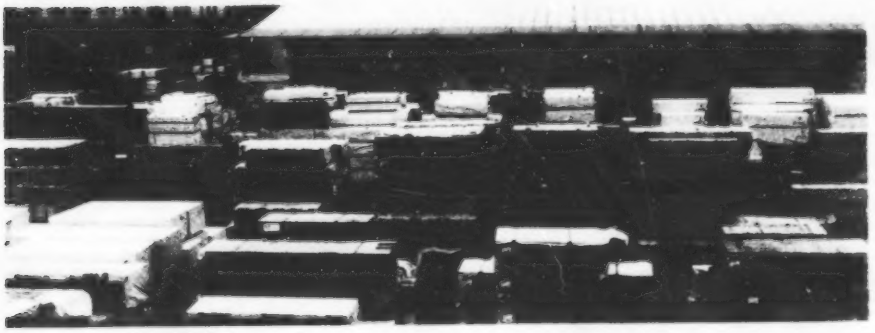
"Canada is most vulnerable on 'J-Grade' construction lumber which represents the highest volume of existing sales."

The fact that softwood product trade has become more global, makes seeking out future areas of competitive advantage for Canadian products in our markets more difficult. It is for this reason that the study *Japan's Value-Added Market: Wood Product Attributes and Competition* included a "competitor analysis." When considering the trends reported here, and assessing where there are linkages between what the market research showed Japan is looking for (demand) against what we do or could produce (supply), it is imperative that this "best fit" be challenged by a number of what-if scenarios. For example, what if the Scandinavian exchange rate advantage relative to Canada in Japan increases? What if harvests in the U.S. West return to historical levels? What if there is a structural change in the demand for existing wood products in not only Japan, but in our much larger U.S. market? What if Russia, who holds roughly 60% of the world's softwood resource, manages to attract capital and bring their lumber production/exports to historical peaks?

The answers to any one of these questions could have a profound impact on the ability of Canadian wood products to compete in Japan. To investigate the likely effects of these types of questions, the competitor analysis included a trade model. Essentially, this model utilizes detailed historical trade data and input price response estimates to predict future trade. (Price response estimates, or *elasticities*, are values that suggest by what percent demand will drop or supply will increase if there is a given percent increase in price.) This was done for softwood lumber and softwood logs.

What made the trade model developed for this study unique is that rather than using production and trade data on softwood lumber or logs in aggregate, categories of product were developed on the basis of price. In the case of softwood lumber, this resulted in four categories:

Softwood lumber #1 High-end appearance grade
Softwood lumber #2 Mid- to low-end appearance grade
Softwood lumber #3 Japan 'J-grade'; U.S. select structural; high-end MSR
Softwood lumber #4 U.S. construction grade



Tokyo Lumber Terminal

Figure 29

Forecast Canadian softwood lumber exports

1997

2002

2007

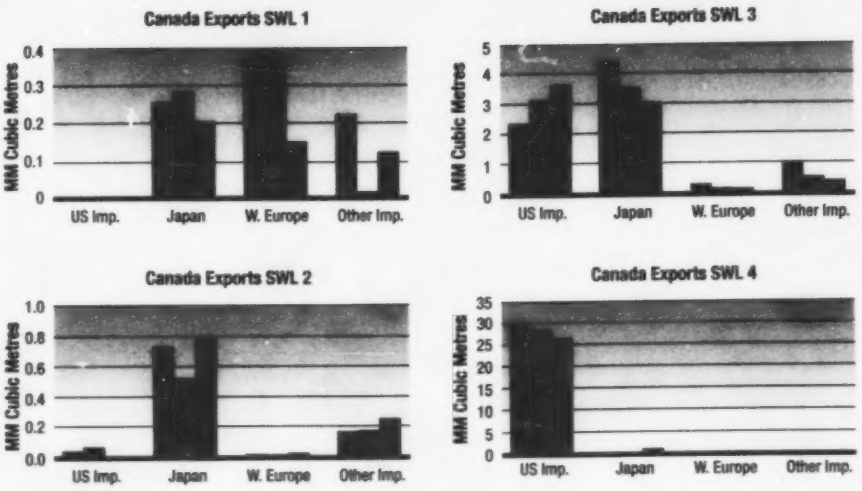


Figure 29 shows the trade model's predictions for 1997 (which matched known trade very closely), 2002 and 2007. The latter two are a result of all of the input assumptions, such as increased exports from New Zealand and Chile, reduced demand in Japan due to lower future housing starts, and so on. Note the importance of softwood lumber #1 – #3 in Japan, and the fact that softwood lumber #4 is only a U.S. market. Also note the growing importance of softwood lumber #3 in the U.S. against a decline in Japan.

Examples of the many possible "what-if" scenarios are illustrated in Figures 30 through 33. The first two show the model's prediction of an increased Russian supply of softwood lumber #3, and a further reduction in Scandinavia's currencies relative to the U.S. dollar in Japan, respectively.

Figure 30

Scenario of increased Russian supply of softwood lumber #3

2002

2007

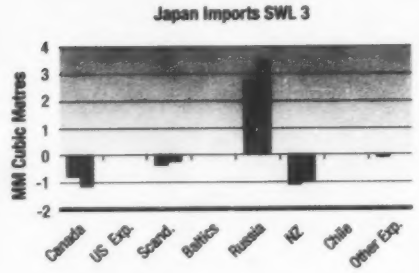
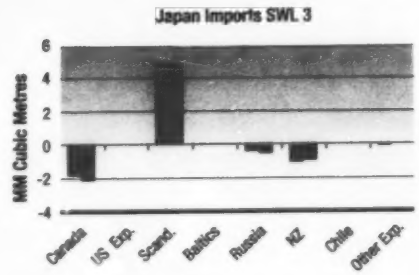


Figure 31

Scenario of reduced Scandinavian currency in Japan relative to the U.S. dollar

2002

2007

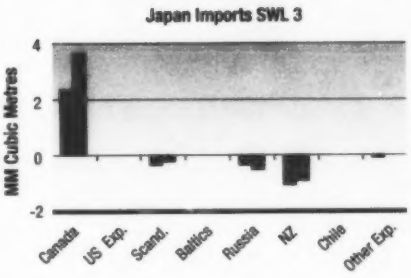


Note the large increase in the Japanese imports of Russian lumber (increased Russian supply reduces price), mostly at the expense of Canadian and New Zealand supply. In the second scenario, note the increase in Japan's imports from Scandinavia due to the increased purchase power of the yen there, again at the expense of Canada and New Zealand.

Finally, Figures 32 and 33 illustrate the effect of increased Canadian supply of softwood lumber #3 and softwood lumber #4, respectively. This scenario implies that Canada's production costs of these lumber categories declines (if world prices don't change, the only way to increase supply is to lower costs). Note that in the case of the Japan construction grade, significant increases in Canada-

Figure 32

Scenario of increased Canadian supply of softwood lumber #3, Japan imports

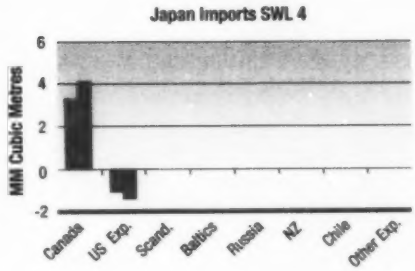


2002 ■

2007 ■

Figure 33

Scenario of increased Canadian supply of softwood lumber #4, U.S. imports



2002 ■

2007 ■

Japan trade occurs at the expense of New Zealand, Russia and Scandinavia. Moreover, Japan's overall imports increase over time as a result of the increased Canadian supply and resulting lower world price.

A similar effect is seen for an increase in the Canadian supply of softwood lumber #4, with increased exports to the U.S. displacing their domestic production to a degree, and increasing overall U.S. consumption.

PRODUCT OPPORTUNITY & THREAT

- Canada remains the continued favored supplier for appearance grade lumber
- Canada most vulnerable on "J-Grade" construction lumber (which represents the highest volume of existing sales). Differentiate Canadian product away from "commodity" status.
- Canada also vulnerable on post & beam construction lumber, for reasons highlighted in the trends presented in this paper, including increased Japan domestic supplies, new products (glulam), and new global suppliers.
- Canada would see increased trade from increased domestic supply, albeit it at lower world prices.

Figure 32

Scenario of increased Canadian supply of softwood lumber #3, Japan imports

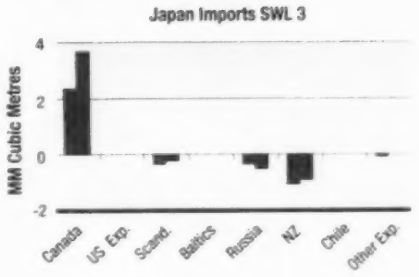
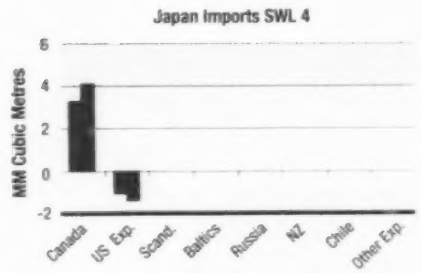


Figure 33

Scenario of increased Canadian supply of softwood lumber #4, U.S. imports



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For more information

The following 11 publications came directly out of Forintek's market and economics research in Japan. Authors include Gaston, Fell and Delcourt from Forintek Canada Corp., and Cohen, Wahl, and Kozak from the University of British Columbia.

Japan's Value-Added Market: Wood Product Attributes and Competition:

Attribute Analysis

1. Introduction and Methodology
2. Building Systems
3. Wood Structural Members
4. Engineered Structural Products
5. Wood for Interior Finish
6. Wood Furniture
7. Wood for Outdoor Furnishings and Decking
8. The Japanese Market for Wood Flooring and Wood Windows

Competitor Analysis

9. Introduction and Methodology
10. Results

Linkage Analysis

11. Linkage Analysis

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